University of Bahrain
College of Information Technology
Department of Computer Science
Semester I, 2011-2012
ITCS 101/ITCS 103 (Introduction to Computer Science)

Mid-Term Exam – Form A

Date: 28th November 2011 **Time: 11:00-12:30PM**

STUDENT NAME	
STUDENT ID #	
SECTION #	

NOTE: THERE ARE SEVEN (7) PAGES IN THIS TEST
WRITE ONLY ONE SOLUTION FOR EACH QUESTION

Question #	MARKS		COMMENTS
1	10	10	
2	12	11.25	
3	11	11	
4	13	12.5	
5	14	14	
TOTAL	60	58.75	

Question 1 (10 Points)

Show your work in each of the following parts

(i) [6 Points] Convert the following numbers from/to indicated bases:

a- $(11010101)_2$ = (213 **$)_{10}$**

1 1 0 1 0 1 0 1

128 64 32 16 8 4 2 1

128 + 64 + 16 + 4 + 1 = 213

b- $(3EB)_{16}$ = (1753 **$)_8$**

8	4	2	1	
0	0	1	1	3
1	1	1	0	E = 14
1	0	1	1	B = 11

001 111 101 011

4	2	1	
0	0	1	1
1	1	1	7
1	0	1	5
0	1	1	3

c- $(46)_{10}$ = (2E **$)_{16}$**

	Div	Rem
46/16	2	14 = E
2/16	0	2

(ii) [4 Points] Perform the following arithmetic operations:

a- The binary sum of 11101 and 11001

```
  1 1 1 0 1
+ 1 1 0 0 1
-----------
1 1 0 1 1 0
```

b- The binary multiplication (product) of 110101 and 111

```
              1 1 0 1 0 1
            ×       1 1 1
-------------------------
              1 1 0 1 0 1
            1 1 0 1 0 1 0  +
          1 1 0 1 0 1 0 0  +
-------------------------
        1 0 1 1 1 0 0 1 1
```

Question 2 (12 Points)

What is the output of the following codes?

num= 5
ch= .

dec= 0.801
str= 2133

(1)

Suppose the user input is: 5.801 2133 66

```
char ch;
int num;
string str;
float dec;
cin >> num >> ch >> dec >> str;
cout << fixed<<showpoint<<setprecision(2);
cout << dec << endl << num << "\n "
      << str << ch;
```

0.80 ✗
5 ✓
2133. ✓

2.25

(2)

```
int n=1, a=4, b=6, c=8;
if(a < 3 || b>5 && c<9)
      n+= b+c;
else
      n+=a;
cout<<" n = "<<n<<endl;
```

n = 1+6+8

n= 15 ✓

(3)

```
cout << setfill('#') << setw(8)
      << "TEST" << endl;
cout << fixed<<showpoint<<setprecision(3);
cout << left << setfill('@')
      << setw(8)<< 7.3228011 << endl;
```

####TEST ✓
7.323@@@ ✓

4 3 2 1 0 -1

(4)

```
int abc = 5;
while ( abc >= 0 )
      cout << --abc << "\t ";
```

4 ▽ 3 ▽ 2 ▽ 1 ▽ 0 ▽ -1

(5)

```
int mon = 25;
switch( mon % 8 ){
      case 0: cout<<"zero.\n";
      case 1: cout<<"one.\n";
      case 2: cout<<"two.\n"; break;
      default: cout<<"Error.\n";
}
cout<<"Bye Bye";
```

one.
two.
Bye Bye

Question 3 (11 Points)

11

Write a program that reads the following from an input file called person.txt:

- Person Full Name written in the first line of the file
- Person CPR number (9-Digits) written in the second line of the file

Your program should find the birth year of this person and write the following message into an output file called birth.txt:

- **Person Full Name** was born in Year 19**YY**

The birth year can be extracted from the first two digits of the CPR. Assume all persons were born before the year of 2000 and after the year 1910.

SAMPLE INPUT/OUTPUT

person.txt file	birth.txt
Jassim Ali Khalid 740707573	Jassim Ali Khalid was born in Year 1974

```
#include <string>
#include <iostream>
# include <fstream>
using namespace std;
int main() {
ifstream fin;
ofstream fout;
string fn;
long cpr;
int year, X;
fin.open("person.txt");
fout.open("birth.txt");
if (!fin || !fout) {
cout<<"can't open files";
return 1; }
getline (fin, fn);
fin>> cpr;
X= cpr / 10000 000 ;
year= 1900 + X;
fout<< fn <<"was born in year" << year;
fin.close();
fout.close();
return 0;
}
```

12.5

Question 4 (13 Points)

Write a C++ program that asks the user to input the weight of a canary bird in grams. The program should determine and display the category of the bird's weight according to the following table:

Weight	Category
BETWEEN 50 GRAMS AND 100 GRAMS	HEALTHY
UNDER 50 BUT ABOVE 20 OR ABOVE 100 BUT UNDER 130	CRITICAL
ALL OTHER RANGES	ENDANGERED

```
#include<iostream>
using namespace std;
int main(){
float weight;
Cout<<" Enter the weight of the canary bird in grams";
Cin>> weight;
if (weight>50 && weight<100)
    cout<<"HEALTHY";
else if (weight<50 && weight>20 || weight>100 && weight<130)
    Cout <<"CRITICAL";
else
  cout<<"ENDANGERED";
return 0;
}
```

-0.5

Question 5 (14 Points)

Write a C++ program that asks the user to input the age and gender (M for male, F for female) of 10 Persian kittens. Your program should count the number of female and male kittens and print the results on the screen.

SAMPLE INPUT/OUTPUT

```
Enter the age and gender of 10 Persian kittens:
3 M
1 M
2 F
.....
.....

5 M


Male Kittens = 4
Female Kittens = 6
```

```
#include <iostream>
 using namespace std;
 int main () {

 int    age , C=0, m=0 , f=0;
char ch;

Cout<<" Enter the age and gender of 10 persian Kittens:";

 while(c<10) {
 Cin>> age>> ch;
 switch(ch) {
   Case 'M': case'm': ++m; break;
 Case 'F' : Case'f': ++f; break;
 }
     ++c }

  Cout<<"Male kittens = "<< m <<endl;
 Cout<< " Female kittens = "<< f;
 return 0;
  }
```